REMARKS

The Office Action mailed April 30, 2008, has been carefully reviewed and the foregoing amendment has been made in consequence thereof.

Claims 1-19 are now pending in this application. Claims 1-7 stand rejected. Claims 8-19 have been withdrawn from consideration.

The rejection of Claims 1-7 under 35 U.S.C. § 103(a) as being unpatentable over Randolph, Jr. et al. (U.S. Pat. No. 6,453,211) ("Randolph") in view of Applicants' Admitted Prior Art ("AAPA") and further in view of Burke et al. (U.S. Pat. No. 6,508,000) ("Burke") is respectfully traversed.

Initially, Applicants respectfully disagree with the Official Notice taken by the Examiner on page 5 of the Office Action. Specifically, Applicants respectfully disagree with the Official Notice that "it was well known to a person of ordinary skill in the art, at the time of invention, to have used titanium weld material to repair turbine components such as blades." Applicants traverse the use of such Official Notice. MPEP section 2144.03 indicates that use of Official Notice should be rare, and that:

> [o]fficial notice unsupported by documentary evidence should only be taken by the examiner where the facts asserted to be well-known, or to be common knowledge in the art are capable of instant and unquestionable demonstration as being well-known ... the notice of facts beyond the records which may be taken by the examiner must be "capable of such instant and unquestionable demonstration as to defy dispute."

Applicants submit that the Official Notice relied upon in the present Office Action does not include facts that are capable of instant and unquestionable demonstration as to defy dispute. More specifically, Applicants submit that the assertion that "it was well known to a person of ordinary skill in the art, at the time of invention, to have used titanium weld material to repair turbine components such as blades" is not a fact that is capable of instant and unquestionable demonstration as to defy dispute. Rather, Applicants submit that it may have been known to use welding materials other than titanium to weld turbine engine components, but Applicants have not been provided a citation to any reference supporting the Official Notice made in the Office Action. The Applicants, therefore, have not been provided a fair opportunity to respond to the assertions and the opportunity to challenge the correctness of the assertions. As such, and in contrast to the Examiner's Official Notice, Applicants

submit that whether it is known to use titanium as a welding material to repair turbine components is a disputable, questionable fact. Accordingly, Applicants submit that the Official Notice taken in the Office Action is improper.

Randolph describes a method of repairing blades (12b) of a blisk (12). The method includes cutting away bend damage (32) of a blade (12b) to form a cutout (46) at a leading edge (42) of blade (12b). Cutout (46) is then filled with weld material, or an insert-welded metallic spade, to form a weld repair (48) that is larger than a nominal configuration of the blade (12b). Randolph also describes that "[i]n a recent development program, the weld repair of titanium blisk for a gas turbine compressor application is being explored. Damage to the relatively thin leading or trailing edges of an individual blade may be repaired by removing the damaged portion and weld repairing the remaining cutout." (See, col. 2, lines 14-19). Notably, Randolph does not describe nor suggest a repair method that includes determining an airfoil reparability limit, wherein the reparability limit defines a maximum chord reduction and a minimum blade thickness, determining a portion of titanium alloy material to be removed based on the determined airfoil reparability limit, removing the determined portion of titanium alloy material from along leading and trailing edges of the airfoil, and along an entire edge area of a radially outer tip of the airfoil to form respective leading edge, trailing edge, and tip cut-backs using an automated plasma-arc weld process. Moreover, Randolph does not describe nor suggest a repair method that includes depositing titanium weld material onto the leading edge, trailing edge, and tip cut-backs using an automated plasma-arc weld process.

AAPA describes an exemplary method of repairing a turbine compressor blade by mechanically removing a worn and/or damaged tip area, and adding a material deposit to the tip area to reform the area to the desired dimension. Notably, AAPA does not describe nor suggest a repair method that includes determining an airfoil reparability limit, wherein the limit defines a maximum chord reduction and a minimum blade thickness, determining a portion of titanium alloy material to be removed based on the determined airfoil reparability limit, removing the determined portion of titanium alloy material from along leading and trailing edges of the airfoil, and along an entire edge area of a radially outer tip of the airfoil to form respective leading edge, trailing edge, and tip cut-backs. Further, AAPA does not describe nor suggest a method that includes depositing titanium weld material onto the leading edge, trailing edge, and tip cut-backs using an automated plasma-arc weld process.

Burke describes a method for repairing airfoil blades (3, 18, and/or 42) along a leading, a trailing edge, or a tip. A portion of the airfoil (3, 18, and/or 42) is removed and replaced with an insert (1). More specifically, the insert (1) is shaped as an arc segment and is transient liquid phase bonded to the original airfoil (3, 18, and/or 42). To perform the transient liquid phase bonding, the insert (1) must be crystallographically and structurally aligned with the original airfoil (3, 18, and/or 42) to avoid forming discontinuities across a bond line. More specifically, the insert (1) must have the same grain/crystal size, alignment, and/or orientation as the original airfoil (3, 18, and/or 42). Mismatches in grain/crystal size, alignment, and/or orientation produce deleterious grain boundaries within the bond. A bond medium or bond foil, for the transient liquid phase bonding must match the chemistry of the insert (1) and the airfoil (3, 18, and/or 42) material to form a uniform microstructure and chemical composition along the bond line. Titanium is then removed from the bond foil to avoid forming deleterious gamma prime eutectics at a bond center line. Notably, Burke does not describe nor suggest a repair method that includes determining a portion of titanium alloy material to be removed based on the determined airfoil reparability limit, removing the determined portion of titanium alloy material from along leading and trailing edges of the airfoil, and along an entire edge area of a radially outer tip of the airfoil to form respective leading edge, trailing edge. Further, Burke does not describe nor suggest a method that includes depositing titanium weld material onto the leading edge, trailing edge, and tip cut-backs using an automated plasma-arc weld process.

Claim 1 recites a method of repairing a gas turbine engine compressor blade airfoil that includes "determining an airfoil reparability limit, the limit defining a maximum chord reduction and a minimum blade thickness . . . determining a portion of titanium alloy material to be removed based on the determined airfoil reparability limit . . . removing the determined portion of titanium alloy material from along leading and trailing edges of the airfoil, and along an entire edge area of a radially outer tip of the airfoil to form respective leading edge, trailing edge, and tip cut-backs which each define cut-back depths, wherein the edge area extends from the leading edge to the trailing edge . . . depositing titanium weld material onto the leading edge, trailing edge, and tip cut-backs using an automated plasma-arc weld process . . . and removing at least some of the titanium weld material to obtain pre-desired finished dimensions for the leading and trailing edges, and radially outer tip."

No combination of Randolph, AAPA, and Burke describes nor suggests a method of repairing a gas turbine engine compressor blade airfoil as is recited in Claim 1. More specifically, no combination of Randolph, AAPA, and Burke describes nor suggests a repair method that includes depositing titanium weld material onto the leading edge, trailing edge, and tip cut-backs using an automated plasma-arc weld process. Moreover, no combination of Randolph, AAPA, and Burke describes nor suggests a method that includes depositing titanium weld material onto the leading edge, trailing edge, and tip cut-backs. Rather, in contrast to the present invention, Randolph describes removing damaged leading and trailing edge portions of a titanium blisk and weld repairing the blisk, AAPA is only recited for describing removing a damaged tip area and adding a material deposit to only that portion of the tip area, and Burke describes an insert that is transient liquid phase bonded to an airfoil to create a bond with a uniform microstructure and chemical composition. Accordingly, for at least the reasons set forth above, Claim 1 is submitted to be patentable over Randolph in view of AAPA, and further in view of Burke.

Claims 2-7 depend, directly or indirectly, from independent Claim 1. When the recitations of Claims 2-7 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claims 2-7 likewise are patentable over Randolph in view of AAPA, and further in view of Burke.

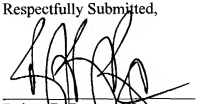
Moreover, Burke requires the removal of titanium from a bonding foil to avoid formation of deleterious gamma prime eutectics at a bond line. As such, Applicants respectfully submit that it would not have been obvious to one skilled in the art to combine the titanium blisks of Randoph with non-titanium bonding foil of Burke. Rather, Applicants submit that the combination of Randolph and AAPA with Burke would not result in a method that includes depositing titanium weld material onto the leading edge, trailing edge, and tip cut-backs using an automated plasma-arc weld process, as is required by Applicants' claimed invention. Accordingly, for this reason alone, Applicants respectfully request that the Section 103 rejection of Claims 1-7 be withdrawn.

For at least the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 1-7 be withdrawn.

In view of the foregoing amendment and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Applicants do not believe any fees are due in connection with this amendment; however, the Commissioner is hereby authorized to charge any fees which may be required to Deposit Account No. 012384 in the name of ARMSTRONG TEASDALE LLP.

Respectfully Submitted,



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